

REMARKS

The Office Action of July 23, 2002 has been received and its contents carefully considered.

Claims 6-20 have been rejected under the second paragraph of 35 U.S.C. § 112 as indefinite.

The Examiner has objected to a number of the terms in various claims because the claims do not provide the details of the products produced from the recited steps.

For example, with respect to claim 6, the Examiner states that it is not clear what the sheet is laminated to or what structure is ultimately formed.

Similarly, with respect to claim 7, the Examiner states that it is not clear where the fold is located or how the various layers are located in the folded structure.

The present specification provides a detailed explanation of the various steps that are recited in the claims. The claim recitations are broad, but this does not mean they are indefinite. Applicants submit that one of ordinary skill in the art reading the claims would know what steps are covered by the claims. The specification provides examples that are within the scope of the recitations of the claims. Applicants submit that the Examiner is attempting to limit the claims to the specific examples disclosed in the specification, but as the case law makes clear the Examiner is not permitted to so limit the claims.

With respect to claim 8, the Examiner states that it is not clear whether a cylindrical die means that a hollow cylinder is formed which is then split to form a sheet, or if a solid cylinder is formed which is then slit and laminated together. Applicants submit that it would be clear to one of ordinary skill in the art that the meaning of claim 8 is that a hollow cylinder is formed which

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is then slit to form a sheet. Applicants submit that the Examiner's alternate interpretation that claim 8 could possibly mean that a solid cylinder is formed is an unreasonable interpretation of the claim because if a solid cylinder is formed, the slitting of the cylinder would not result in the formation of a sheet. The Examiner states that similar problems exist in claims 9 to 21.

Applicants submit that these claims do not suffer from similar problems because one of ordinary skill in the art would readily understand the meaning of these claims.

In view of the above, Applicants submit that the claims comply with the requirements of the second paragraph of 35 U.S.C. § 112 and, accordingly, request withdrawal of this rejection.

Claims 1, 2 and 28-29 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,180,751 to Park et al.

In response, Applicants have cancelled claim 1 and 2, and have amended claim 28 to depend from either claim 3, 6 or 19. These claims are discussed below.

Claims 1-3, 6-20 and 28-31 have been rejected under 35 U.S.C. § 103(a) as obvious over Park et al.

Applicants submit that Park et al do not disclose or render obvious the claims that are in the present application.

Applicants have cancelled claims 1 and 2, and have amended claims 3, 6 and 19 to place them in independent form.

The Examiner states that Park et al differ from the claimed invention because Park et al do not disclose the particular claim structures that are made by the method, such as where the vapor barrier is located. The Examiner argues that it would have been obvious to have applied the barrier layers to the polyolefin foamed material in order to optimize the properties that were

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desired in the final product. Thus, the Examiner asserts that it would have been obvious to apply the gas barrier layer either as an outer surface to the foam layers or as an intermediate layer between foam layers.

With regard to claim 3, what is specified in claim 3 is not the die lip diameter but a relation between the die lip diameter and the amount of the resin to be extruded through the extrusion die. Park et al do not suggest that it is necessary to select the dimensions of the extrusion die and the amount of the resin to be extruded so as to satisfy the formula specified in claim 3 in order to obtain multilayer foamed sheets having excellent conditions of cells and excellent appearance.

With respect to claim 6, Park et al do not disclose or suggest the lamination of a multilayer foamed sheet itself or lamination of two or more multilayer foamed sheets. Therefore, the inventions of claims 6 and these claims dependent on claim 6, such as claim 8, are not suggested by the cited reference.

With respect to claim 7, Applicants do not see where Park et al disclose or suggest folding up a multi-layer polyolefin foamed sheet and superimposing the folded up sheets and laminating together.

With respect to the method of claim 9, a gas barrier resin sheet prepared in advance is laminated with a co-extruded multilayer polyolefin foamed sheet. In contrast, Park et al teach only a method in which a functional layer (i.e. barrier gas layer) is formed together with other layers by extrusion. Park et al do not teach or suggest the method of claim 9 which uses a gas barrier resin sheet prepared previously.

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With respect to claim 10, Applicants do not see where Park et al suggest an incising step at two points to form multi-layer polyolefin foamed sheets which are then laminated together with a gas barrier resin sheet as an intermediate layer. Similarly, claim 11 requires the laminating of two polyolefin sheets and is not suggested or disclosed by Park et al. Claims 13 and 14 also require the lamination of two multi-layer polyolefin layered sheets. Claims 15, 16, 17 and 18 also require the lamination of two multi-layer polyolefin sheets laminated together. None of these claims is suggested or disclosed by Park et al.

Regarding claims 19 and 20, claim 19 has been amended to place it in independent form. These claims are characterized by performing a pressure reducing step for passing the extruded multilayer foamed sheet through a vacuum chamber to increase an expansion ratio of the foamed layer. Park et al do not disclose or suggest such a step of reducing pressure.

With regard to claims 28 to 30, Applicants have amended claim 28 to depend from claims 3, 6 or 19.

With regarding to claim 31, Applicants submit that this claim is patentable because this claim depends from claim 6 or 19, and Applicants believe that claims 6 and 19 are patentable as described above.

In view of the above, Applicants submit that Park et al do not defeat the patentability of the claims that are in the present application, and accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1, 2, 4, 5, 21 to 27 and 32 to 47 are canceled.

The claims are amended as follows:

3. (Amended) ~~The~~ A method for producing a multilayer polyolefin foamed sheet ~~according to claim 1,~~ comprising at least one polyolefin foamed layer and at least one polyolefin non-foamed layer, wherein the method uses a producing apparatus comprising at least one first extruder for extruding a material for forming a polyolefin foamed layer wherein the first extruder is equipped with a foaming agent-supplying device for supplying a foaming agent to a cylinder, at least one second extruder for extruding a material for forming a polyolefin non-foamed layer and at least one extrusion die for co-extruding the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer therethrough to form the multilayer polyolefin foamed sheet, the method comprising:

a melt kneading step in which, in the first extruder, a resin material for forming a polyolefin foamed layer is melted and the melted resin material for forming a polyolefin foamed layer and a foaming agent supplied from the foaming agent-supplying device are mixed to form the material for forming a polyolefin foamed layer;

a melting step in which the material for forming a polyolefin non-foamed layer is melted in the second extruder; and

a co-extruding step in which the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer in their melted states are co-extruded into

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atmospheric pressure through the extrusion die and the extruded material for forming a polyolefin foamed layer is foamed to form the multilayer polyolefin foamed sheet, and

wherein the co-extruding step is conducted under conditions satisfying the relationship of
$$10 \geq Q \text{ (kg/hr)}/W \text{ (mm)} \geq 0.3$$

wherein Q (kg/hr) denotes the amount of the resin to be extruded through the extrusion die and W (mm) denotes a die lip diameter.

6. (Amended) ~~The~~ A method for producing a multilayer polyolefin foamed sheet ~~according to claim 1, comprising at least one polyolefin foamed layer and at least one polyolefin non-foamed layer, wherein the method uses a producing apparatus comprising at least one first extruder for extruding a material for forming a polyolefin foamed layer wherein the first extruder is equipped with a foaming agent-supplying device for supplying a foaming agent to a cylinder, at least one second extruder for extruding a material for forming a polyolefin non-foamed layer and at least one extrusion die for co-extruding the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer therethrough to form the multilayer polyolefin foamed sheet, the method comprising:~~

a melt kneading step in which, in the first extruder, a resin material for forming a polyolefin foamed layer is melted and the melted resin material for forming a polyolefin foamed layer and a foaming agent supplied from the foaming agent-supplying device are mixed to form the material for forming a polyolefin foamed layer;

a melting step in which the material for forming a polyolefin non-foamed layer is melted in the second extruder; and

a co-extruding step in which the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer in their melted states are co-extruded into atmospheric pressure through the extrusion die and the extruded material for forming a polyolefin foamed layer is foamed to form the multilayer polyolefin foamed sheet, and

further comprising a laminating step for laminating at least one multilayer polyolefin foamed sheet produced.

19. (Amended) ~~The~~ A method for producing a multilayer polyolefin foamed sheet ~~according to claim 1, comprising at least one polyolefin foamed layer and at least one polyolefin non-foamed layer, wherein the method uses a producing apparatus comprising at least one first extruder for extruding a material for forming a polyolefin foamed layer wherein the first extruder is equipped with a foaming agent-supplying device for supplying a foaming agent to a cylinder, at least one second extruder for extruding a material for forming a polyolefin non-foamed layer and at least one extrusion die for co-extruding the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer therethrough to form the multilayer polyolefin foamed sheet, the method comprising:~~

a melt kneading step in which, in the first extruder, a resin material for forming a polyolefin foamed layer is melted and the melted resin material for forming a polyolefin foamed layer and a foaming agent supplied from the foaming agent-supplying device are mixed to form the material for forming a polyolefin foamed layer;

a melting step in which the material for forming a polyolefin non-foamed layer is melted in the second extruder; and

a co-extruding step in which the material for forming a polyolefin foamed layer and the material for forming a polyolefin non-foamed layer in their melted states are co-extruded into atmospheric pressure through the extrusion die and the extruded material for forming a polyolefin foamed layer is foamed to form the multilayer polyolefin foamed sheet, and

further comprising a pressure reducing step for passing the extruded multilayer polyolefin foamed sheet through a vacuum chamber to increase an expansion ratio of the foamed layer.

28. (Amended) The method for producing a multilayer polyolefin foamed sheet according to ~~claim 1~~ claim 3, 6 or 19, further comprising an extending step for extending the co-extruded multilayer polyolefin foamed sheet in a direction perpendicular to the extruding direction by means of an extending device, wherein the extending step is conducted after the co-extruding step.

Claim 48 has been added as a new claim.